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EXAMINER	
LIN, TINA M	

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 03/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/038,099	MEAD ET AL.	
	Examiner	Art Unit	
	Tina M Lin	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *20,32 and 40-42* is/are allowed.

6)☒ Claim(s) *1-6,8,11,12,14-16,19,21-31 and 33-39* is/are rejected.

7)☒ Claim(s) *7,9,10,13,17 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Brian Healy
Primary Examiner

This Office action is responsive to applicant's communication filed on 29 January 2004. Corrections of the minor informalities, such as the drawings and claim 39, are noted by the Examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,456,762 B1 to Nishiki et al. and in view of U.S. Patent 6,307,626 B1 to Miles et al. and U.S. Patent 5,776,674 to Ulmer. Nishiki et al. discloses forming a Bragg grating by applying an ultraviolet light emitted from a second harmonic laser with a wavelength of about 240 nm and an outputting means to write the grating on the fiber. Nishiki et al. further discloses that the ultraviolet laser light is only one possibility for writing a Bragg grating into a fiber, but fails to disclose a Ti:Sapphire laser specifically for write the Bragg grating. (Column 4 Lines 10-30) Applicant additionally discloses that a Ti:sapphire laser medium is not necessary to produce the Bragg gratings as well. (Specification, Page 3, Lines 10-12) However, Miles et al. discloses a general teaching of frequency tripling a Ti:Sapphire laser to produce a tunable light in the vicinity of 253.7 nm. Furthermore, Miles et al. discloses tuning and controlling the laser by a pump laser, therefore disclosing that the Ti:Sapphire laser is able to be controlled to produce a wavelength in the vicinity of 253.7 nm. (Column 8 and 9) Additionally, Ulmer further discloses by frequency tripling the laser, the output of the Ti:Sapphire laser can be tuned over the

wavelength range of 240-300 nm, falling within the specified range disclosed by Applicant. (Column 10). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have controlled the Ti:Sapphire laser to produce a wavelength range between 230-250 nm.

Claims 2-10, 12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,456,762 B1 to Nishiki et al. and in view of U.S. Patent 6,307,626 B1 to Miles et al. and U.S. Patent 5,776,674 to Ulmer as applied to claim 1 above and in further view of U.S. Patent 6,574,255 B1 to Caprara et al. In regards to claims 2-4 and 6, Nishiki et al., Miles et al. and Ulmer disclose all discussed above and Miles et al. further discloses a pump laser to pump a frequency into the Ti:Sapphire laser. But Miles et al. fails to disclose any details of the controlling pump source, such as pumping the Ti:Sapphire laser with a second harmonic pump beam to produce a third harmonic laser output beam, where the pumping means comprises an active laser, second pumping means for pumping the active laser and doubling means for doubling the frequency emitted by the active laser. However, Caprara et al. discloses a pumping means to create a second and third harmonic emitted by doubling or tripling the frequency of an emitted light, where the pumping means includes tow laser diodes, one an active laser and the second to pump the active laser in order to double the frequency emitted by the active laser. (Column 3) Furthermore, in the "Technical Field of the Invention" and "Discussion of Background Art" section disclosed by Caprara et al., Caprara et al. discloses that the pumping means can be used in solid state lasers in the UV regions, preferably to wavelengths less than 300 nms. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used a laser diode in order to pump a second harmonic

into the Ti:Sapphire laser to produce a third harmonic output, where the pumping means includes two diode lasers to produce an output beam having its frequency doubled.

In regards to claim 5, Nishiki et al., Miles et al. and Ulmer disclose all discussed above but fails to disclose a tripling means for generating a third harmonic bean from the second harmonic pump beam and mixing the third harmonic beam with the output of the Ti:Sapphire laser. However Caprara et al. discloses a frequency tripled radiation to generate a third harmonic beam and mixing that third harmonic beam with another output frequency. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used a tripling means for generating a third harmonic bean from the second harmonic pump beam and mixing the third harmonic beam with the output.

In regards to claim 8, Nishiki et al., Miles et al. and Ulmer disclose all discussed above but fails to disclose the controlling means to comprise of a resonator where the active laser and doubling means are disposed within the resonator. However, Caprara et al. does disclose a laser-resonator with an optical non-linear crystal inside in order to frequency double the laser radiation. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used a resonator where the active laser and doubling means are disposed within the resonator.

In regards to claims 12, 15 and 16, Nishiki et al., Miles et al. and Ulmer disclose all discussed above but fails to disclose a solid state laser comprising a pump for pumping an active laser medium to produce a fundamental beam and a non linear crystal for producing a second harmonic pump beam from the fundamental beam top be used to pump the Ti:Sapphire laser. However, Caprara et al. does disclose a laser-diode pump to pump the active laser with a

fundamental beam and a non-linear crystal in a resonant cavity to produce a second harmonic beam. Therefore, since Caprara et al. disclose the use of the laser diode configuration in solid state lasers in the UV regions, preferably to wavelengths less than 300 nms, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used a pump for pumping an active laser medium to produce a fundamental beam and a non linear crystal for producing a second harmonic pump beam from the fundamental beam top be used to pump the Ti:Sapphire laser.

In regards to claim 14, Nishiki et al., Miles et al. and Ulmer disclose all discussed above but fails to disclose a tripler crystal for generating a third harmonic beam and a mixing crystal for missing the third harmonic beam with the Ti:Sapphire crystal. However, Caprara et al. discloses a crystal arranged to frequency triple the wavelength in order to create a third harmonic beam from a second harmonic pump beam and then further mixing the third harmonic beam. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used a tripler crystal for generating a third harmonic beam and a mixing crystal for missing the third harmonic beam with the Ti:Sapphire crystal.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,456,762 B1 to Nishiki et al. and in view of U.S. Patent 6,307,626 B1 to Miles et al. and U.S. Patent 5,776,674 to Ulmer and in further view of U.S. Patent 6,574,255 B1 to Caprara et al. Nishiki et al. discloses forming a Bragg grating by applying an ultraviolet light emitted from a second harmonic laser with a wavelength of about 240 nm and an outputting means to write the grating on the fiber. Nishiki et al. further discloses that the ultraviolet laser light is only one possibility for writing a Bragg grating into a fiber, but fails to disclose a Ti:Sapphire laser

specifically for write the Bragg grating. (Column 4 Lines 10-30) Applicant additionally discloses that a Ti:sapphire laser medium is not necessary to produce the Bragg gratings as well. (Specification, Page 3, Lines 10-12) However, Miles et al. discloses a general teaching of frequency tripling a Ti:Sapphire laser to produce a tunable light in the vicinity of 253.7 nm. Furthermore, Miles et al. discloses tuning and controlling the laser by a pump laser, therefore disclosing that the Ti:Sapphire laser is able to be controlled to produce a wavelength in the vicinity of 253.7 nm. (Column 8 and 9) Additionally, Ulmer further discloses by frequency tripling the laser, the output of the Ti:Sapphire laser can be tuned over the wavelength range of 240-300 nm, falling within the specified range disclosed by Applicant. (Column 10). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have controlled the Ti:Sapphire laser to produce a wavelength range between 230-250 nm. Additionally, Nishiki et al., Miles et al. and Ulmer all fail to disclose pumping an active laser medium to generate a fundamental beam, frequency doubling the fundamental pump beam to generate a second harmonic and generating a third harmonic from the second harmonic. However, Caprara et al. discloses pumping an active laser medium to create a fundamental beam and then frequency doubling the fundamental pump beam to generate a second harmonic and further generating a third harmonic from the second harmonic beam output. Further, Caprara et al. discloses that the pumping means can be used in solid-state lasers in the UV regions, preferably to wavelengths less than 300 nms. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used the steps disclosed by Caprara et al. in order to produce a Bragg grating on an optical waveguide.

Claims 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,456,762 B1 to Nishiki et al. and in view of U.S. Patent 6,307,626 B1 to Miles et al. and U.S. Patent 5,776,674 to Ulmer and in further view of U.S. Patent 6,574,255 B1 to Caprara et al. Nishiki et al. discloses forming a Bragg grating by applying an ultraviolet light emitted from a second harmonic laser with a wavelength of about 240 nm and an outputting means to write the grating on the fiber. Nishiki et al. further discloses that the ultraviolet laser light is only one possibility for writing a Bragg grating into a fiber, but fails to disclose a Ti:Sapphire laser specifically for write the Bragg grating. (Column 4 Lines 10-30) Applicant additionally discloses that a Ti:sapphire laser medium is not necessary to produce the Bragg gratings as well. (Specification, Page 3, Lines 10-12) However, Miles et al. discloses a general teaching of frequency tripling a Ti:Sapphire laser to produce a tunable light in the vicinity of 253.7 nm. Furthermore, Miles et al. discloses tuning and controlling the laser by a pump laser, therefore disclosing that the Ti:Sapphire laser is able to be controlled to produce a wavelength in the vicinity of 253.7 nm. (Column 8 and 9) Additionally, Ulmer further discloses by frequency tripling the laser, the output of the Ti:Sapphire laser can be tuned over the wavelength range of 240-300 nm, falling within the specified range disclosed by Applicant. (Column 10). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have controlled the Ti:Sapphire laser to produce a wavelength range between 230-250 nm. But Nishiki et al., Miles et al. and Ulmer fail to disclose a diode laser to produce a third harmonic laser beam. However, Caprara et al. does disclose the use of a diode laser by initially mixing the fundamental harmonic (~720 nm), then further mixing the resultant harmonics and through resonators in order to produce a third harmonic beam to produce a Bragg grating.

Therefore, since Caprara et al. further discloses that the pumping means can be used in solid state lasers in the UV regions, preferably to wavelengths less than 300 nms, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used a diode laser to produce a third harmonic laser beam.

Claims 29-31 and 33-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,456,762 B1 to Nishiki et al. and in view of U.S. Patent 6,307,626 B1 to Miles et al. and U.S. Patent 5,776,674 to Ulmer and in further view of U.S. Patent 6,574,255 B1 to Caprara et al. Nishiki et al. discloses forming a Bragg grating by applying an ultraviolet light emitted from a second harmonic laser with a wavelength of about 240 nm and an outputting means to write the grating on the fiber. Nishiki et al. further discloses a applying the UV light through a phase mask to write the Bragg grating into the waveguide. Nishiki et al. further discloses that the ultraviolet laser light is only one possibility for writing a Bragg grating into a fiber, but fails to disclose a Ti:Sapphire laser specifically for write the Bragg grating. (Column 4 Lines 10-30) Applicant additionally discloses that a Ti:sapphire laser medium is not necessary to produce the Bragg gratings as well. (Specification, Page 3, Lines 10-12) However, Miles et al. discloses a general teaching of frequency tripling a Ti:Sapphire laser to produce a tunable light in the vicinity of 253.7 nm. Furthermore, Miles et al. discloses tuning and controlling the laser by a pump laser, therefore disclosing that the Ti:Sapphire laser is able to be controlled to produce a wavelength in the vicinity of 253.7 nm. (Column 8 and 9) Additionally, Ulmer further discloses by frequency tripling the laser, the output of the Ti:Sapphire laser can be tuned over the wavelength range of 240-300 nm, falling within the specified range disclosed by Applicant. (Column 10). Therefore, it would have been obvious at the time the invention was made to a

person having ordinary skill in the art to have controlled the Ti:Sapphire laser to produce a wavelength range between 230-250 nm. But also, Nishiki et al. fails to disclose the specifics of the phase mask used. However, Caprara et al. does disclose a plurality of mirrors to direct the light arrays. Furthermore, although Nishiki et al. and Caprara et al. fail to specifically mention the phase mask to diffract rays from the output beam and the mirrors to reflect the light rays to have them interfere with each other, by definition, the function of a phase mask interferometer performs that function. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used a phase mask to aid in the production of the Bragg grating on the optical waveguide. Additionally, in claims 37-39, in place of the use of a phase mask, applicant claims the use of a proximity mask, a Lloyd mirror or a prism interferomenter to aid in the production of the Bragg grating in the optical waveguide. However, since Applicant discloses that all of these different components all yield the same result, a Bragg grating written into an optical waveguide, it is a non-critical aspect of the invention. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used either a phase mask interferomenter, a proximity mask, a Lloyd mirror or a prism interferomenter to aid in the production of the Bragg grating in the optical fiber.

Allowable Subject Matter

Claims 7, 9, 10, 13, 17 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record fails to disclose or reasonably suggest an apparatus for producing a Bragg grating in an optical fiber by using a Ti:Sapphire

laser in the wavelength range of 230-250 nms, where the Ti:Sapphire laser is disposed within the first resonator means or where the controlling means for the Ti:Sapphire laser comprises a third resonator or where there is a third non-linear crystal for producing a third harmonic beam.

Claim 20 is allowed. The prior art of record in this application fails to disclose or reasonably suggest a method of producing a Bragg grating with all of the steps disclosed by applicant.

Claims 32 and 40-42 are allowed for the reasons indicated in the previous office action.

The applicant's arguments have been carefully studied and re-evaluated by the examiner. The arguments advanced therein, considered together with the amendments made to the claims, are persuasive and the rejections based upon prior art made of record in the previous Office Action are withdrawn. During a careful review of the prior art of record in this application, however, it has been discovered that a prior art cited in the previous Office Action is much more relevant than previously realized. Accordingly, a new rejection is set forth below. This action is **not** made final.

Applicant's arguments with respect to claims 1-31 and 33-39 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tina M Lin whose telephone number is (571) 272-2352. The examiner can normally be reached on Monday-Friday 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TML

Brian Healy
Primary Examiner